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REMARKS

Claims 1-36 were pending in the present application. Claims 1, 5, 15, and 32-33 have been amended, and Claims 22-31 have been withdrawn as a result of a restriction requirement, leaving Claims 1-21 and 32-36 for consideration upon entry of the present amendment. No new matter has been entered because of these amendments. For example, support for the amendment of Claims 1 and 32 can be found in Figure 2. Claim 5 has been amended to provide proper antecedent basis. Claims 15 and 33 have been amended to further clarify the sidewall openings of the process chamber. Claims 1 and 32 have also been amended to further clarify the sidewall openings of the process chamber.

Reconsideration and allowance of the claims is respectfully requested in view of the following remarks.

Election/Restrictions

Applicants confirm election of Group I, Claims 1-21 and 32-36. Accordingly, Claims 22-31 are withdrawn from further consideration as being drawn to non-elected inventions.

Claim Rejections Under 35 U.S.C. §112, second paragraph

Claim 33 stands rejected under 35 U.S.C. §112, second paragraph, as allegedly being indefinite for failing to particularly point our and distinctly claim the subject matter which applicant regards as the invention. Applicants respectfully traverse.

Claim 33 has been amended to correct a typographical error and as such, the rejection is requested to be withdrawn.

Claim Rejections Under 35 U.S.C. §102(b)

Claims 1-3, 6, 7, 10-14, 16, 18, 19, 21, and 32-35 stand rejected under 35 U.S.C. §102(b) as allegedly anticipated by U.S. Patent No. 5,077,875 to Hoke et al. (hereinafter "Hoke"). Applicants respectfully traverse.

Independent Claim 1 is directed to a reactor assembly comprising a base unit; a chuck assembly disposed in a cavity of the base unit, wherein the chuck assembly comprises a support having a surface capable of receiving a substrate; a process chamber comprising a top wall, a bottom wall, and sidewalls extending therefrom, and a cylindrical opening extending through the bottom wall to the top wall to define a substantially cylindrically shaped interior region, wherein the process chamber is coupled to the base unit; an inlet manifold assembly in fluid communication with a first sidewall opening of the process chamber in a selected one of the sidewalls, wherein the inlet manifold assembly comprises a flow-shaping portion adapted to laterally elongate a gas and/or a reactant flow into the process chamber; and an exhaust manifold assembly in fluid communication with a second sidewall opening of the process chamber in the sidewall diametrically opposed from the selected one of the sidewalls.

Independent Claim 32 is directed to a reactor assembly comprising a base unit; a chuck assembly disposed in a cavity of the base unit, wherein the chuck assembly comprises a support having a surface capable of receiving a substrate; a process chamber comprising a transparent top wall, a bottom wall, and sidewalls extending therefrom, and a cylindrical opening extending through the bottom wall to the top wall to define a substantially cylindrically shaped interior region, wherein the process chamber is coupled to the base unit; a light source assembly in operable communication with the transparent top wall for projecting radiation into the process chamber; an inlet manifold assembly in fluid communication with a first sidewall opening of the process chamber in a selected one of the sidewalls, wherein the inlet manifold assembly comprises a flow-shaping portion adapted to laterally elongate a gas and/or a reactant flow into the process chamber; and an exhaust manifold assembly in fluid communication with a second sidewall opening of the process chamber in the sidewall diametrically opposed from the selected one of the sidewalls.

Hoke is generally directed to a metalorganic vapor deposition reactor vessel. The reactor vessel generally includes a chamber having a top surface that is substantially parallel to a substrate disposed within the chamber. A baffle plate is disposed adjacent to an inlet to increase uniformity and decrease turbulence of a vapor stream flowing through the chamber.

A block is disposed within the chamber, which is positioned between the baffle plate and a substrate support assembly.

To anticipate a claim under 35 U.S.C. §102, a single source must contain all of the elements of the claim. *Lewmar Marine Inc. v. Barient, Inc.*, 827 F.2d 744, 747, 3 U.S.P.Q.2d 1766, 1768 (Fed. Cir. 1987), *cert. denied*, 484 U.S. 1007 (1988).

Hoke fails to anticipate independent Claims 1 and 32 because Hoke fails to disclose a process chamber as claimed by Applicants. Applicants' process chamber comprises a transparent top wall, a bottom wall, and sidewalls extending therefrom, and a cylindrical opening extending through the bottom wall to the top wall to define a substantially cylindrically shaped interior region, wherein the process chamber is coupled to the base unit. Hoke fails to disclose a process chamber including a cylindrical opening extending through the bottom wall to the top wall to define a substantially cylindrically shaped interior region as claimed. Hoke teaches a rectangularly shaped interior region.

As all elements of independent Claims 1, and 32 have not been disclosed, these claims are patentable over the cited reference. Given that Claims 2-3, 6, 7, 10-14, 16, 18, 19, 21, and 33-35 each further limit and ultimately depend from one of these independent claims, they too are patentable.

First Claim Rejection Under 35 U.S.C. §103(a)

Claims 4 and 36 stand rejected under 35 U.S.C. §103(a), as allegedly unpatentable over Hoke in view of U.S. Patent No. 6,383,330 to Raaijmakers et al. (hereinafter "Raaijmakers"). Applicants respectfully traverse.

Hoke is as described above.

Raaijmakers is generally directed to an elliptically shaped process chamber. The chamber has thin upper and lower walls made from a generally transparent material, such as quartz, wherein the upper and lower walls have convex exterior surface and a concave

interior surface. As a result of the cylindrical shape, a distance between upper wall and a substrate placed within the process chamber is non-uniform.

In making a Section 103 rejection, the Examiner bears the burden of establishing a prima facie case of obviousness. *In re Fine*, 5 U.S.P.Q. 2d 1596, 1598 (Fed. Cir. 1998). The Examiner ". . . can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in art would lead that individual to combine the relevant teachings of the references". Id. Applicants assert that a prima facie case of obviousness has not been established and that no motivation is provided in the cited art that would lead to their combination.

A prima facie case has not been established because the cited references, individually or in combination, fail to teach or suggest a reactor assembly comprising, *inter alia*, a process chamber including a transparent top wall, a bottom wall, and sidewalls extending therefrom, and a cylindrical opening extending through the bottom wall to top the wall to define a substantially cylindrically shaped interior region, wherein the process chamber is coupled to the base unit. Hoke is generally directed to a rectangularly shaped interior region. In Raaijmakers, there is no disclosure or suggestion of a cylindrical opening extending through the bottom wall to top the wall to define a substantially cylindrically shaped interior region. Applicants' claimed process chamber advantageously minimizes chamber volume without having to place blocks within the chamber as described by Hoke. Thus, a combination of the cited references would fail to teach or suggest a cylindrical opening extending through the bottom wall to top the wall to define a substantially cylindrically shaped interior region.

With regard to motivation to combine, Hoke teaches away from the use of cylindrical process chambers commenting that:

> "There are several advantages to using a growth chamber having such a top surface 25 disposed substantially parallel to the substrate 63, rather than the more conventional cylindrical shaped chamber. In a rectangular chamber 11, the distance from the surface of the substrate 63 to the tope surface 25 of the

> chamber 11 is uniform across the surface of the substrate 63. Since wall surfaces provide drag on gas flow, decreasing the uniformity of the velocity of such flow and potentially resulting in non-uniform deposition, the gas flow pattern in a rectangular chamber 11 will typically be more uniform than that in a cylindrical chamber. Also, an increase in the size of the substrate 63 will require less additional chamber volume with a rectangular chamber 11 since only the width of such as chamber would increase, whereas in a cylindrical chamber the overall diameter would increase."

(Hoke, Col. 7, ll. 37-53)

Since Hoke teaches away from the use of cylindrical shaped chambers, one of ordinary skill in the art would not combine the teachings of Hoke with art requiring the cylindrical shape chamber as taught by Raaijmakers. The cylindrical shape as taught by Raaijmakers refers to the upper and lower surfaces that have exterior concave surfaces and inner convex surfaces such that the top or bottom walls are not uniformly spaced apart from a substrate placed therein. This is the type of cylindrical shaped chambers that Hoke teaches away from. Thus, there is no motivation to combine these references.

For at least these reasons, Claims 4 and 36 are patentably distinguished over the cited references. Withdrawal of the rejection is respectfully requested.

Second Claim Rejection Under 35 U.S.C. §103(a)

Claim 5 stands rejected under 35 U.S.C. §103(a), as allegedly unpatentable over Hoke in view of an STIC translation of JP02-15221 to Mikio Takagi et al. (hereinafter "Mikio"). Applicants traverse.

Claim 5 depends from Claim 1 and as such includes the feature of a process chamber comprising a top wall, a bottom wall, and sidewalls extending therefrom, and a cylindrical opening extending through the bottom wall to the top wall to define a substantially cylindrically shaped interior region, wherein the process chamber is coupled to the base unit.

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Hoke has previously been described and fails to teach or suggest a process chamber comprising a top wall, a bottom wall, and sidewalls extending therefrom, and a cylindrical opening extending through the bottom wall to the top wall to define a substantially cylindrically shaped interior region.

Mikio fails to compensate for the deficiencies of Hoke. Mikio is generally directed to a vertical semiconductor manufacturing system that includes multiple vertically stacked process chambers. Pairs of process chambers are piled along the vertical direction to minimize the clean room footprint. There is no disclosure or suggestion of a process chamber comprising a top wall, a bottom wall, and sidewalls extending therefrom, and a cylindrical opening extending through the bottom wall to the top wall to define a substantially cylindrically shaped interior region. Moreover, Hoke teaches wrapping an RF coil about the process chamber such that it is believed that stacking multiple process chambers would be prevented. Still further, the drive mechanism for the rotating support is positioned underneath the process chamber. The drive mechanism requires a drive shaft (Hoke, Figure 4, Ref. No. 22) to effect rotation of the support platen. Relocating the drive shaft is not possible. Thus, the drive mechanism as suggested by Hoke would also prevent stacking multiple process chambers. In view of these differences, a combination of the cited references would fail to establish a prima facie case of obviousness and would likely not provide any reasonable expectation of success. It is believed that the Examiner is improperly relying on hindsight by picking and choosing various elements as he deems fit.

For at least these reasons, the rejection of Claim 5 is requested to be withdrawn.

Third Claim Rejection Under 35 U.S.C. §103(a)

Claims 8 and 9 stand rejected under 35 U.S.C. §103(a), as allegedly unpatentable over Hoke in view of U.S. Patent No. 5,228,501 to Tepman et al. (hereinafter "Tepman"). Applicants traverse.

Claims 8 and 9 depends from Claim 1 and, as such, includes the feature of a process chamber comprising a top wall, a bottom wall, and sidewalls extending therefrom, and a

cylindrical opening extending through the bottom wall to the top wall to define a substantially cylindrically shaped interior region, wherein the process chamber is coupled to the base unit.

For reasons previously discussed, Hoke fails to teach or suggest a reactor assembly comprising a process chamber comprising a top wall, a bottom wall, and sidewalls extending therefrom, and a cylindrical opening extending through the bottom wall to the top wall to define a substantially cylindrically shaped interior region, wherein the process chamber is coupled to the base unit.

Tepman does not compensate for the deficiencies of Hoke. Tepman is generally directed to temperature-regulated platens. A clamping mechanism is taught to provide improved thermal contact between the platen and a substrate place thereon. There is no disclosure or suggestion of suggest a reactor assembly comprising a process chamber comprising a top wall, a bottom wall, and sidewalls extending therefrom, and a cylindrical opening extending through the bottom wall to the top wall to define a substantially cylindrically shaped interior region, wherein the process chamber is coupled to the base unit.

Accordingly, the rejection applied to Claims 8 and 9 is requested to be withdrawn.

Fourth Claim Rejection Under 35 U.S.C. §103(a)

Claim 15 stands rejected under 35 U.S.C. §103(a), as allegedly unpatentable over Hoke in view of U.S. Patent No. 4,839,145 to Gale et al. (hereinafter "Gale"). Applicants traverse.

Claim 15 depends from Claim 1 and, as such, includes the feature of a process chamber comprising a top wall, a bottom wall, and sidewalls extending therefrom, and a cylindrical opening extending through the bottom wall to the top wall to define a substantially cylindrically shaped interior region, wherein the process chamber is coupled to the base unit.

For reasons previously discussed, Hoke fails to teach or suggest a reactor assembly comprising a process chamber comprising a top wall, a bottom wall, and sidewalls extending therefrom, and a cylindrical opening extending through the bottom wall to the top wall to define a substantially cylindrically shaped interior region, wherein the process chamber is coupled to the base unit.

Gale fails to compensate for the deficiencies of Hoke. Gale is generally directed to a chemical vapor deposition reactor. Gale fails to teach or suggest a reactor assembly comprising a process chamber comprising a top wall, a bottom wall, and sidewalls extending therefrom, and a cylindrical opening extending through the bottom wall to the top wall to define a substantially cylindrically shaped interior region, wherein the process chamber is coupled to the base unit.

Moreover, it is noted that the Examiner has combined Gale with Hoke so as to teach and suggest a third sidewall opening for transporting a substrate into an interior region of the processing chamber taught by Hoke. However, it has been previously noted that Hoke employs an RF coil about the processing chamber. To remove the RF coil, one must rotate the coil about the process chamber so as to clear a shaft cover as well as the process chamber (Hoke, Col. 9, ll. 39-41). Thus, even if one were to combine Gale with Hoke, there is no reasonable expectation of success since robotic transport of the substrate into the process chamber as taught by Hoke would be impeded by the RF coil. In view of these difficulties in implementing a third sidewall opening in the process chamber as taught by Hoke, one of ordinary skill in the art would not be motivated to combine these references.

Accordingly, the rejection of Claim 15 is requested to be withdrawn.

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Fifth Claim Rejection Under 35 U.S.C. §103(a)

Claim 17 stands rejected under 35 U.S.C. §103(a), as allegedly unpatentable over Hoke in view of U.S. Patent No. 5,190,592 to Chazee et al. (hereinafter "Chazee"). Applicants traverse.

Claim 17 depends from Claim 1 and, as such, includes the feature of a process chamber comprising a top wall, a bottom wall, and sidewalls extending therefrom, and a cylindrical opening extending through the bottom wall to the top wall to define a substantially cylindrically shaped interior region, wherein the process chamber is coupled to the base unit.

For reasons previously discussed, Hoke fails to teach or suggest a reactor assembly comprising a process chamber comprising a top wall, a bottom wall, and sidewalls extending therefrom, and a cylindrical opening extending through the bottom wall to the top wall to define a substantially cylindrically shaped interior region, wherein the process chamber is coupled to the base unit.

Chazee is generally directed to aerosol injection system. Like Hoke, Chazee also fails to teach or suggest a reactor assembly comprising a process chamber comprising a top wall, a bottom wall, and sidewalls extending therefrom, and a cylindrical opening extending through the bottom wall to the top wall to define a substantially cylindrically shaped interior region, wherein the process chamber is coupled to the base unit.

For at least these reasons the rejection of Claim 17 is requested to be withdrawn.

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Sixth Claim Rejection Under 35 U.S.C. §103(a)

Claim 20 stands rejected under 35 U.S.C. §103(a), as allegedly unpatentable over Hoke in view of U.S. Patent No. 6,355,108 to Won et al. (hereinafter "Won"). Applicants traverse.

Claim 20 depends from Claim 1 and, as such, includes the feature of a process chamber comprising a top wall, a bottom wall, and sidewalls extending therefrom, and a cylindrical opening extending through the bottom wall to the top wall to define a substantially cylindrically shaped interior region, wherein the process chamber is coupled to the base unit.

For reasons previously discussed, Hoke a reactor assembly comprising a process chamber comprising a top wall, a bottom wall, and sidewalls extending therefrom, and a cylindrical opening extending through the bottom wall to the top wall to define a substantially cylindrically shaped interior region, wherein the process chamber is coupled to the base unit.

Won fails to compensate for the deficiencies of Hoke. Won is generally directed to a substrate alignment system. The process chamber as described in Won is an axial flow reactor as is evident from the location of a gas distribution plate positioned above the platen. Won fails to teach a reactor assembly comprising a process chamber comprising a top wall, a bottom wall, and sidewalls extending therefrom, and a cylindrical opening extending through the bottom wall to the top wall to define a substantially cylindrically shaped interior region, wherein the process chamber is coupled to the base unit.

In view of the foregoing, the rejection of Claim 20 is requested to be withdrawn.

It is believed that the foregoing remarks fully comply with the Office Action and place the application in condition for immediate allowance, which action is earnestly solicited.

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If there are any additional charges with respect to this Amendment or otherwise, please charge them to Deposit Account No. 06-1130 maintained by Applicants' Attorneys.

Respectfully submitted,

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